



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,710	02/25/2002	Robert W. Allington	18-587-9-1	5831
23898	7590	07/09/2004	EXAMINER	
VINCENT L. CARNEY LAW OFFICE			ROGERS, DAVID A	
P.O. BOX 80836			ART UNIT	
LINCOLN, NE 68501-0836			PAPER NUMBER	
			2856	

DATE MAILED: 07/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/082,710

Applicant(s)

ALLINGTON ET AL.

Examiner

David A. Rogers

Art Unit

2856

-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 28-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3, 5-8, 11, 12 and 30 is/are allowed.
- 6) ☒ Claim(s) 1, 2, and 9 is/are rejected.
- 7) ☒ Claim(s) 4, 10, 28, and 29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 29 April 2004 have been fully considered with regard to claims 1, 2, 4, 9, 10, 28, and 29. The applicant's arguments with regard to claims 1, 2, and 9 are not persuasive. Claims 4, 10, 28, and 29 now stand as objected to as noted below. Claims 1-12 and 28-30 remaining pending in this application

The applicant traverses the rejection of claims 1 and 9 as being unpatentable under 35 USC 103(a) over Helms *et al.* (United States Patent 4,678,917) in view of Horsman *et al.* (United States Patent 6,019,897). The grounds for traversal are that neither Helms *et al.* nor Horsman *et al.* discloses the problem allegedly solved by the applicant. The problem allegedly solved by the applicant is to obtain sufficient energy from each of a plurality of flow cells for each stroke time for which each photocell is connected to an output circuit during multiplexing.

Helms *et al.* teaches all of the claim limitations except for the use of a plurality of flow cells. The applicant makes no claim to "receiving sufficient energy", and Helms *et al.* would inherently accomplish this as it has a plurality of photocells individually connected to output circuits that are then connected to a multiplexing circuit. Horsman *et al.* teaches that it is known to use a plurality of flow cells in a chromatograph. In combination with Helms *et al.*, more flow cells would allow for faster, more accurate sample analysis. The

structure and method of the applicant's claims is known by the obvious combination of Helms *et al.* and Horsman *et al.*

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the use of a plurality of chromatograph columns and flow cells overcomes the prior of one column and one flow cell (see Horsman *et al.*, column 1, lines 8-27).

The applicant traverses the rejection of claim 2 under 35 USC 103(a) over Helms *et al.* in view of Horsman *et al.* and Smisko (United States Patent 4,902,886) as Smisko does not teach the problem solved by the applicant.

Helms *et al.* and Horsman *et al.* teach the claimed structure and method, except for the express teaching of a low bandwidth circuit. Helms *et al.* teaches a plurality of circuits that receive signals from a photocell array, and each circuit inherently operates in a predetermined bandwidth range. Smisko was relied up to teach that it is known to apply a low bandwidth circuit for reducing noise in a photodiode array. It would have been obvious to use a low bandwidth, as taught by Smisko, in order to reduce noise. Furthermore,

applying a low bandwidth criteria to any circuit is obvious, and in this particular case there is a specific teaching and motivation to do so (reduces noise from signals from a photocell/photodiode array).

Furthermore, in the applicant's arguments on page 15, it is noted that the specification states:

"Preferably the energy storing circuit is a non-switching circuit with low bandwidth and a flat-topped response to an impulse. This improves the signal to noise ratio."

By this, the applicant obtains an improved signal to noise ratio by the combined use of low bandwidth and a flat-topped response. Therefore, the limitation of having a flat-topped response must be included with claim 2. This further limitation would be an unobvious feature over the references of Helms *et al.*, Horsman *et al.*, and Smisko as applied to claim 2. Please note that this amendment may require an additional search as this has not been considered during examination.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent 4,678,917 to Helms *et al.* in view of United States Patent 6,019,897 to Horsman *et al.*

Helms *et al.* teaches an improved polychromatic spectrophotometer method and apparatus which is particularly useful in the field of liquid chromatography in which a solvent solution carrying one or more materials to be analyzed is introduced into a chromatograph column, and the eluent issuing from the column is optically analyzed in a sample cell. The apparatus comprises a sample flow cell (reference item 14), a reservoir (reference item 232) for a solvent which may consist of one or more solvent liquids, a pump (reference item 236) to pump the solvent from the reservoir. A known volume of the material which is to be tested is injected into the solvent through a syringe (reference item 240) at the injection valve (reference item 238), and the pressure of the pump forces the solvent with the solute through a chromatograph column (reference item 244), which terminates in the sample cell. Analysis of the column is provided using radiation from a deuterium lamp (reference item 10) directed to a reflector (reference item 12) and then through the sample cell. The radiation emanating from the cell is directed to a diffraction grating (reference item 18) which diffracts the emanated radiation into a polychromatic, spatially divergent beam and directs the divergent beam to a linear array of photodetectors (reference item 22). Different spectral segments of the beam are intercepted by different photodetectors within the array.

The signals from all of the photodetectors are separately and substantially simultaneously sampled and held to thereby obtain data usable

for a high-accuracy, wide-spectrum chromatogram. To accomplish this purpose, the signals from the photodetectors are carried through separate signal channels including connections (reference item 24) to amplifiers (reference items 26, 28, and 94), and from the amplifiers to sample-and-hold circuits (reference items 96, 98, and 164). Helms *et al.* also teaches that that there will be 35 photodetectors in the array, with associated amplifiers and sample-and-hold circuits. The sample-and-hold circuits are controlled by a multiplex switch (reference item 166) operating in response to control signals from a sequence control (reference item 168) through a connection (reference item 170). The multiplex switch causes the sample-and-hold circuits to simultaneously sample, then to stop sampling and simultaneously "hold", and then to cause a sequential read-out of the analog quantities represented by those signals for conversion from analog to digital form in an analog-to-digital converter (reference item 172). As such, the sample-and-hold circuits are non-switching circuits as the overall switching functionality is provided by the controller and the multiplex switch. Furthermore, the sample-and-hold switches inherently have an associated bandwidth. The sequence controller also controls the A/D converter. The resultant digital data is then stored and processed. The signals held in the sample-and-hold circuits (reference items 212, 214, and 230) are processed by the multiplex switch and the A/D converter in exactly the same way. Finally, Helms *et al.* teaches that the system provides a signal-to-noise ratio improvement of about ten to one, in

addition to providing for a much faster data rate. Helms *et al.* does not teach a chromatograph comprising a plurality of flow cells.

Horsman *et al.* teaches a liquid chromatograph comprising a plurality of pumps (reference item 14A-14D) and flow columns (reference item 12).

Horsman *et al.* further admits that it is well known in the prior art to use a single pump to simultaneously provide solvent to multiple columns operating simultaneously such as the commercially available Parallax HPLC available from Biotage wherein a common electrical motor simultaneously drives pistons in four pumps supplying solvent to four respective chromatography columns connected in parallel. Horsman *et al.* teaches that the preferred apparatus has the advantage of very high throughput of solvent through the chromatography columns. The system can be used to purify or analyze one sample using many different types of media or different solvent systems to evaluate the performance, selectivity, and differences.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Helms *et al.* with the teachings of Horsman *et al.* in order to provide a liquid chromatograph with a plurality of sample columns and a multiplex circuit for sampling and controlling the sampling.

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Helms *et al.* in view of Horsman *et al.* as applied to claim 1 above, and further in view of United States Patent 4,902,886 to Smisko.

Helms *et al.* in view of Horsman *et al.* teaches the use of a multiplexing circuit for controlling a plurality of input sample-and-hold circuits as part of a liquid chromatograph. The sample-and-hold circuits of Helms *et al.* inherently have an associated bandwidth. Helms *et al.* in view of Horsman *et al.* does not expressly teach the use of at least one low-bandwidth circuit.

Smisko teaches an apparatus and method for reducing noise in a light sensing circuit having a photodiode array for spectrometers. Smisko clearly states that low-bandwidth circuits are beneficial for noise reduction from the photodiode array. Smisko does not teach the use of a low-bandwidth circuit that is a non-switching circuit. However, the specific teaching of the benefit of low-bandwidth can be easily applied to any circuit type as required by one of ordinary skill in the art.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Helms *et al.* in view of Horsman *et al.* with the teachings of Smisko in order to provide a chromatograph and/or a spectrograph with at least one low-bandwidth, non-switching circuit for noise reduction.

Allowable Subject Matter

5. Claims 3, 5-8, 11, 12, 30 are allowed.
6. Claims 4, 10, 28, and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Rogers whose telephone number is (571) 272-2205. The examiner can normally be reached on Monday - Friday (0730 - 1600).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron E. Williams can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dar
01 July 2004

HELEN KWOK
PRIMARY EXAMINER

